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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/870,243	05/30/2001	Robert L. Brainard	50540	• 8839

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EXAMINER

LEE, SIN J

ART UNIT

PAPER NUMBER

1752

DATE MAILED: 09/06/2002

5

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/870,243

Applicant(s)

BRAINARD ET AL.

Examiner

Sin J Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 May 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5, 6, 20-26, 36 and 37 is/are rejected.
- 7) ☒ Claim(s) 4, 7-19, 27-35 and 38-40 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

1. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claims 35-39 have been renumbered as 36-40.

2. Claims 7-19, 27-35, 38-40 are objected to under 37 CFR 1.75© as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim. See MPEP § 608.01(n). Accordingly, the claims 7-19, 27-35, 38-40 have not been further treated on the merits. woot ✓

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. ~~Claims 21-26~~ ^{most} are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 21, applicants recite, "the photoresist coating layer exhibiting, . . . enhanced photoacid generation efficiency as determined by Dill C-Parameter method *to polymer*

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containing solely phenolic and acrylate repeat units.” What do applicants mean by “Dill C-Parameter method *to polymer containing solely phenolic and acrylate repeat units*”? Do applicants mean that the Dill C-Parameter method is performed to polymer containing solely phenolic and acrylate repeat units, or do they mean that the phenolic resin claimed in present claim 21 is a polymer containing solely phenolic and acrylate repeat units?

Appropriate correction and/or clarification is required. For the purpose of examining the claim on the merit, the Examiner assumed that applicants meant that the phenolic resin of present claim 21 is a polymer containing solely phenolic and acrylate repeat units (based on the reading of present specification, pg.6, lines 11-18).

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

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6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-3, 5, 6, 20-22, and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Ikemura et al (6,235,446 B1).

Ikemura teaches (see abstract, col.2, lines 35-65, col.3, lines 1-17) a chemically amplified positive resist composition comprising a copolymer possessing three recurring units of vinyl *phenol*, t-butyl (*meth*)*acrylate*, and alicyclic (*meth*)*acrylate* (present polymer containing solely phenolic and acrylate repeat units of claim 21) and a photosensitive acid generator. Ikemura teaches in col.12, lines 10-12 that the amount of the acid generator is usually 0.5 to 20 parts by weight of the copolymer, and Ikemura specifically uses 8 parts of the photoacid generator in Example 7 (see Table 1). The 8 parts of the photoacid generator used in Example 7 converts to 6.8% *by wt* of the photoacid generator based on weight of total solids of the photoresist composition of Example 7. Ikemura also teaches (col.2, lines 34-44) steps of (a) coating a substrate with a film comprising his photoresist composition; (b) exposing the film selectively to a predetermined pattern of radiation such as x-ray, e-beam, or deep UV radiation to form a latent image; and © developing the image using a suitable developer composition. Therefore, the prior art teaches present inventions of claims 1-3, 5, 6, 20-22, and 25. It is the Examiner's position that since the prior art teaches present photoresist composition on a substrate (in claim 21), the

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prior art's photoresist coating layer would inherently exhibit, upon exposure to radiation having a wavelength of less than about 160 nm, or e-beam or I-beam radiation, enhanced photoacid generation efficiency as determined by Dill C-Parameter method as presently recited in claim 21.

8. Claims ~~23~~, ~~24~~, and ~~26~~ are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikemura et al (6,235,446 B1).

Ikemura et al with respect to claims 20 and 21 are discussed above in Paragraph 7. Although in Example 7, Ikemura specifically uses 8 parts (6.8 wt%) of the photoacid generator, Ikemura also teaches (col.12, lines 10-12) that his photoacid generator can be used in any amount ranging from 0.5 to 20 parts by weight based on 100 parts by wt of his copolymer. It is the Examiner's position that it would have been obvious to one of ordinary skill in the art to use 20 parts of the photoacid generator in Ikemura's Example 7 (instead of 8 parts) with a reasonable expectation of achieving a chemically amplified resist which has efficient response to various radioactive rays and is capable of resolving any of line-and-space pattern, isolated patterns, and contact hole patterns with satisfactory appearance and resolution. Since 20 parts of the photoacid generator used in Ikemura's Example 7 would convert to 15.3 wt% (*which is about 15 wt%*) based on the weight of total solids of the photoresist composition of Example 7, the prior art's teaching would render obvious present inventions of claims 23, 24, and 26.

9. Claims 1-3, ~~5~~, ~~6~~, ~~20-22~~, and ~~25~~ are rejected under 35 U.S.C. 102(e) as being anticipated by Chiba et al (6,280,900 B1).

In Example 10 (see Table 1 and also col.2, lines 38-42), Chiba teaches a chemically amplified resist composition comprising a resin (a copolymer of p-hydroxystyrene, t-butyl

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acrylate, and styrene) and total sum of 8 parts of two photoacid generators. The copolymer of p-hydroxystyrene, t-butyl acrylate, and styrene fits the descriptions of present "phenolic/acrylate resin" on pg.6 of present specification. The 8 parts of the two photoacid generators used in the Example 10 converts to 5% by wt based on weight of total solids of the photoresist composition of Example 10. Chiba also teaches (col.17, lines 47-60, col.18, lines 3-10) that his composition solution is applied to a substrate, and the resist film is then exposed to form a desired pattern to radiation (such as I-rays, X-rays, or e-beams) and then developed using an alkaline developer to form a predetermined resist pattern. Therefore, the prior art teaches present inventions of claims 1-3, 5, 6, 20-22, and 25. It is the Examiner's position that sine the prior art teaches present photoresist composition on a substrate (in claim 21), the prior art's photoresist coating layer would inherently exhibit, upon exposure to radiation having a wavelength of less than about 160 nm, or e-beam or I-beam radiation, enhanced photoacid generation efficiency as determined by Dill C-Parameter method as presently recited in claim 21.

10. Claims ~~23~~, ~~24~~, and ~~26~~ are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiba et al (6,280,900 B1).

Chiba et al with respect to claims 20 and 21 are discussed above in Paragraph 9.

Although in Example 10, Chiba specifically uses 8 parts (5 wt%) of the photoacid generators Chiba also teaches (col.10, lines 8-11) that his photoacid generator can be used in any amount ranging from 0.1-20 parts by weight based on 100 parts by wt of his resin. It is the Examiner's position that it would have been obvious to one of ordinary skill in the art to use 20 parts of the photoacid generators in Chiba's Example 10 (instead of 8 parts) with a reasonable expectation of

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achieving a chemically amplified resist exhibiting excellent sensitivity and resolution. Since 20 parts of the photoacid generators used in Chiba's Example 10 would convert to 12% by wt based on the weight of total solids of the photoresist composition of Example 10, the prior art's teaching would render obvious present inventions of claims 23, 24, and 26.

11. Claims ~~36~~ and ~~37~~ are rejected under 35 U.S.C. 102(e) as being anticipated by Lin et al (6,187,505 B1).

Lin teaches (see abstract, col.2, lines 53-62, col.3, lines 14-28) a chemically amplified negative-tone silicon-containing resist composition suitable for irradiation sources such as EUV, X-ray, e-beam and I-bema, comprising a phenolic silicon-containing polymer and a photoacid generator. Lin furthermore teaches (col.7, lines 57-62) that the photoacid generator (their component (c)) is preferably used from about 0.001 to about 14 wt% in the chemically amplified silicon-containing negative-tone resist composition. It is the Examiner's position that one of ordinary skill in the art would immediately envisage using the photoacid generator in the amount of about 14 wt% in Lin's photoresist composition since 14 wt% is taught as the end point of the range. Therefore, the prior art teaches present inventions of claims 36 and 37.

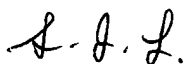
12. Claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims since none of the cited prior arts teaches or suggests the use of EUV radiation for the exposure step.

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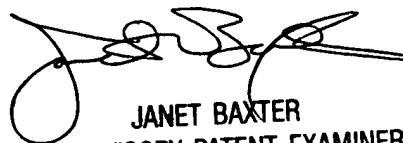
13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is (703) 305-0504. The examiner can normally be reached on Monday-Friday from 8:30 am EST to 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ms. Janet Baxter, can be reached on (703) 308-2303. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9311 for after final responses or (703) 872-9310 for before final responses.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-0661.



S. Lee
August 30, 2002



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